What is claimed is:

1. A communication network comprising a plurality of optical stations adapted to be coupled to each other by free space optical links, a first as said optical stations being a base station adapted to do to be coupled to (a) stations other than said optical stations and (b) at least one of the plural optical stations, each of the plural optical stations having an identification and being arranged to couple optical messages to others of the optical stations via the optical links, each of the messages including a data portion and an identifier for a destination station of the message, each of the optical stations being arranged for (a) determining if the destination station identifier in a message matches the identification of the optical station receiving the message, and (b) responding to the data portion of the message in response to the identifier being the identification of that particular station, others of the optical stations being arranged for (a) determining if the destination station identifier in a message matches the identification of the optical station receiving the message, (b) responding to the data portion of the message in response to the identifier being the identification for that particular station, and (c) relaying the message toward the destination station in response to the identifier being different from the identification for that particular station.

2. The network of claim 1 wherein the messages are arranged in packets, each of the packets including overhead bits indicating a packet type and the destination station identifier.

3. The network of claim 2 wherein the overhead bits also indicate (a) the identification of the optical station originating the message, and (b) the type of station emitting the message.

4. The network of any of claims 1-3 wherein at least one of the plural

optical stations is a relay station for (a) detecting the destination station identifier in messages that the relay station receives, and (b) relaying the message toward the destination station in response to the detected identifier, the relay station being incapable of responding to the data portion of the message.

5. The network of any of claims 1-4 wherein at least some of the plural optical stations arranged for performing (a), (b) and (c) are end user stations.

6. The network of any of claims 1-5 wherein some of the optical stations are mobile.

7. The network of any of claims 1-6 wherein each of the optical stations is arranged for transmitting each message on a monochromatic carrier having a particular wavelength, each of the optical stations including a receive array associated with or without a filter arrangement for passing the wavelength to detectors of the receive array and preventing other wavelengths from substantially affecting the detectors of the receive array.

8. The network of any of claims 1-7 wherein each of the optical stations is arranged for transmitting each message on a monochromatic carrier having a particular wavelength, each of the optical stations including a transmit array associated with a filter arrangement for (a) passing the wavelength to free space from emitters of the transmit array and (b) preventing other wavelengths from substantially affecting the emitters of the transmit array.

9. The network of any of claims 1-8 wherein each of the optical stations includes a transmit array and a receive array, the transmit and receive arrays of a particular optical station being at different locations so that photons emitted from the transmit array at the particular optical station do not interfere with signals arriving at detectors of the receive array at the particular optical station.

10. The network of any of claims 1-9 wherein each of the optical stations includes a transmitter array and a receive array, the transmit and receive arrays at any particular optical station being associated with plural beams, some of the plural beams of one optical station being arranged to be coupled with more than one of the other optical stations of the network.

11. The network of claim 10 wherein at least two of the plural beams of one optical station that are arranged to be coupled with one or more of the optical stations have overlapping beams when incident on detectors in a receiver array of an optical station coupled via one of the optical links with the optical station transmitting the overlapping beams.

12. The network of any of claims 1-11 wherein the optical stations are arranged so there are plural optical links among some of the optical stations, each of the plural optical links between some of the optical stations including different intermediate optical stations for relaying messages from an originating optical station to a designated destination optical station.

13. The network of any of claims 1-12 wherein the optical stations are arranged so each beam incident on a receiving optical station includes rays essentially parallel, each optical station including (a) an array of optical detectors arranged in detector areas and (b) an optical element for focusing each beam incident on one detector area of the receiving optical station.

14. The network of any of claims 1-13 wherein each optical station includes a transmit array of optical emitters for emitting optical beams, and an optical element for causing each emitted beam to diverge slightly as it travels through free space, the emitters and optical arrangement being arranged so that beams derived from different emitters of the same emitting array can propagate to different optical

receiving stations.

15. The network of any of claims 1-14 wherein each optical station includes a receive array having many avalanche photodiodes.

16. The network of any of claims 1-15 wherein each optical station includes a transmit array including many optical emitters each having an associated beam and a receive array including many optical detector areas each having an associated beam, the beam of a detector area of a receiver optical station corresponding with the beam of an emitter of transmitter optical station.

17. An optical station for use in a communication network having a plurality of the optical stations, the optical stations being adapted to be coupled to each other by free space optical links, each of the plural optical stations having an identifier, the optical station comprising a receiver of free space optical energy messages and an emitter of free space optical energy messages, each of the messages including a data portion and an identifier for a destination station of the message, the optical station being arranged for (a) determining if the destination station identifier in a message matches the identification of the optical station, (b) responding to the data portion of the message in response to the identifier being the identification for the station, and (c) relaying the message toward the destination station in response to the identifier being different from the identification for the station.

18. The station of claim 17 wherein the messages are arranged in packets, each of the packets including overhead bits indicating a packet type and the destination station identifier.

19. The station of claim 18 wherein the overhead bits also indicate (a) the identification of the optical station originating the message and (b) the type of station emitting the message.

20. The station of any of claims 17-19 wherein the optical station is a relay station for (a) detecting if the destination station identifier in messages that the relay station receives.

21. The station of any of claims 17-19 wherein the optical station is an end user station.

22. The station of any of claims 17-19 or 21 wherein the optical station is mobile.

23. The station of any of claims 17-22 wherein the optical station is arranged for transmitting each message on a monochromatic carrier having a particular wavelength, the optical station including a receive array associated with a filter arrangement for passing the wavelength to detectors of the receive array and preventing other wavelengths from substantially affecting the detectors of the receive array.

24. The station of any of claims 17-23 wherein the optical station is arranged for transmitting each message on a monochromatic carrier having a particular wavelength, the optical station including a transmit array associated with a filter arrangement for (a) passing the wavelength to free space from emitters of the transmit array and (b) preventing other wavelengths from substantially affecting the emitters of the transmit array.

25. The station of any of claims 17-24 wherein the optical station includes a transmit array and a receive array, the transmit and receive arrays being at different locations so that photons emitted from the transmit array of the optical station do not interfere with detectors of the receive array at the station.

26. The station of any of claims 17-25 wherein the optical station includes a transmit array and a receive array, the transmit and receive arrays each being

associated with plural beams, some of the plural beams being arranged to be coupled with more than one of the other optical stations of the network.

27. The station of claim 26 wherein at least two of the plural beams that are arranged to be coupled with more than one of the other optical stations of the network have overlapping portions when incident on detectors in a receiver array of another optical station of the network.

28. The station of any of claims 17-27 wherein each beam incident on the optical station includes rays that are essentially parallel, the optical station including (a) an array of optical detectors arranged in detector areas and (b) an optical arrangement for focusing each beam on one of the detector areas.

29. The station of any of claims 17-28 wherein each optical station includes a transmit array of optical emitters for emitting optical beams, and an optical arrangement for causing each beam to diverge slightly as it propagates in free space, the emitters and optical arrangement being arranged so that beams derived from different emitters of the transmit array can propagate to different optical stations of the network.

30. The station of any of claims 17-29 including a receive array having many avalanche photodiodes.

31. The station of any of claims 17-30 further including a transmit array including many optical emitters each having an associated beam, and a receive array including many optical detector areas each having an associated beam, the beam of a detector area of the station corresponding with the beam of an emitter of a transmitting optical station of the network, the transmitting optical station being different from the station of claims 17-31.

32. An optical station for use in a communication network having a plurality

of optical stations, the optical stations being adapted to be coupled to each other by free space optical links, the optical station comprising a receiver of free space optical energy messages and a transmitter of free space optical energy messages, the receiver including a receive array having many optical detector element areas each having an associated beam, the transmitter including a transmit array including many optical emitter elements each having an associated beam, the beam of a detector area corresponding with the beam of an emitter element of an originating optical station of the network, an optical arrangement associated with the receive and transmit arrays, the optical arrangement and the arrays being such that beams associated with different elements of each array can be coupled with different stations of the network or can overlap when coupled with different stations of the network.

33. An optical station for use in a communication network having a plurality of optical stations, the optical stations being adapted to be coupled to each other by free space optical links, the optical station comprising a receiver of free space optical energy messages and a transmitter of free space optical energy messages, the receiver including a receive array having many optical detector element areas each having an associated beam, the transmitter including a transmit array including many optical emitter elements each having an associated beam, the beam of a detector area corresponding with the beam of an emitter element of an originating optical station of the network, an optical arrangement associated with the receive and transmit arrays, the optical arrangement and the arrays being such that beams associated with different elements of each array can be coupled with different stations of the network, the receive array including many avalanche photodiodes.

34. An optical station for use in a communication network having a plurality

of optical stations, the optical stations being adapted to be coupled to each other by free space optical links, the optical station comprising a receiver of free space optical energy messages and a transmitter of free space optical energy messages, the receiver including a receive array having many optical detector element areas each having an associated beam, the transmitter including a transmit array including many optical emitter elements each having an associated beam, the beam of a detector area corresponding with the beam of an emitter element of an originating optical station of the network, an optical arrangement associated with the receive and transmit arrays, the optical arrangement and the arrays being such that beams associated with different elements of each array can be coupled with different stations of the network, the optical emitter elements emitting a monochromatic carrier having a particular wavelength, the receive array being associated with a filter arrangement for passing the wavelength to detectors of the receive array and preventing other wavelengths from substantially affecting the detectors of the receive array.

35. An optical station for use in a communication network having a plurality of optical stations, the optical stations being adapted to be coupled to each other by free space optical links, the optical station comprising a receiver of free space optical energy messages and a transmitter of free space optical energy messages, the receiver including a receive array having many optical detector element areas each having an associated beam, the transmitter including a transmit array including many optical emitter elements each having an associated beam, the beam of a detector area corresponding with the beam of an emitter element of an originating optical station of the network, an optical arrangement associated with the receive and transmit arrays, the optical arrangement and the arrays being such that beams

associated with different elements of each array can be coupled with different stations of the optical emitter elements emitting a monochromatic carrier having a particular wavelength, the transmit array being associated with a filter arrangement for (a) passing the wavelength to free space from the emitters of the transmit array and (b) preventing other wavelengths from substantially as affecting the emitters of the transmit array.

36. An optical station for use in a communication network having a plurality of optical stations, the optical stations being adapted to be coupled to each other by free space optical links, the optical station comprising a receiver of free space optical energy messages and a transmitter of free space optical energy messages, the receiver including a receive array having many optical detector element areas each having an associated beam, the transmitter including a transmit array including many optical emitter elements each having an associated beam, the beam of a detector area corresponding with the beam of an emitter element of a transmitter optical station of the network, an optical arrangement associated with the receive and transmit arrays, the optical arrangement and the arrays being such that beams associated with different elements of each array can be coupled with different stations of the transmit and receive arrays being at different locations so that photons emitted from the transmit array at the station do not interfere with detectors of the receive array at the station.